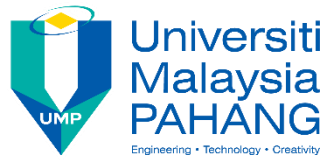


**SERIOUS GAME IN LEARNING ENGLISH
(GRAMMAR RACE)**

**ATIQAHA BINTI MOHD NOR
CD15002**

**Bachelor of Computer Science (Graphics &
Multimedia Technology) with Honours**

UNIVERSITI MALAYSIA PAHANG



SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of the degree of Computer Science in Graphics & Multimedia Technology.

(Supervisor's Signature)

Full Name : TUTY ASMAWATY BINTI ABDUL KADIR

Position : SUPERVISOR

Date : 28 MAY 2019



STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

(Student's Signature)

Full Name : ATIQAHI BINTI MOHD NOR

ID Number : CD15002

Date : 28 MAY 2019

SERIOUS GAME IN LEARNING ENGLISH
(GRAMMAR RACE)

ATIQAHA BINTI MOHD NOR

Thesis submitted in fulfillment of the requirements
for the award of the degree of
Bachelor of Computer Science (Graphics & Multimedia Technology)

Faculty of Computer System & Software Engineering
UNIVERSITI MALAYSIA PAHANG

MAY 2019

ACKNOWLEDGEMENTS

In completing this minor project, I have been fortunate to have help, support and encouragement from many people. I would like to acknowledge them for their cooperation.

Firstly, I would like to thank my supervisor, Mrs. Tuty Asmawaty Abdul Kadir for the support and guidance on how to write this thesis and gave me more idea on how to elaborate my project. Without his guidance and support, this project would not have come to completion and may got many mistakes.

Secondly, I would like to acknowledge the help of Universiti Malaysia Pahang (UMP) for giving me this chance to be involved in the process of this project and to finish up my degree studies. I had gain many knowledge that can be used in the future.

Lastly, I would like to give my greatest appreciate to my mother, Wan Moh binti Wan Kadir, who has been supporting me spiritually and emotionally during this period of time. Not to forget, also my family members for their continuous moral support and encouragement. Special thanks to all my classmates and my friends from diploma and degree that always here to study together, teach and learn from each other, doing discussion together and always give a helping hand when needed.

ABSTRAK

Bahasa Inggeris diajar sebagai Bahasa kedua di sekolah rendah dan menengah di Malaysia. Objektif utama kurikulum Bahasa Inggeris di sekolah adalah untuk membantu pelajar mendalami Bahasa itu supaya mereka boleh menggunakannya dalam kehidupan seharian yang mana untuk melanjutkan pelajaran atau pekerjaan nanti. Beberapa masalah telah timbul dimana terdapat pelajar yang sangat lemah dalam mata pelajaran Bahasa Inggeris disebabkan suasana pembelajaran di dalam kelas yang bosan dan tidak menarik. Selain itu, kebanyakan makmal computer di sekolah tidak digunakan untuk proses pembelajaran disebabkan kurangnya bahan-bahan pengajaran digital. Oleh itu, satu penyelesaian dicadangkan iaitu dengan mencipta satu serious game untuk belajar Bahasa Inggeris dengan cara interaktif dan menyeronokkan. Kandungan Serious game ini lebih menumpukan kepada topik tata bahasa yang mana empat tajuk kecil di dalamnya ialah kata nama am, kata nama khas, dan penjodoh bilangan. Game ini terbahagi kepada tiga level iaitu, easy, medium and hard yang mana pemain perlu menggerakkan kereta untuk memilih jawapan yang betul berdasarkan soalan-soalan yang diberi. Markah akan diberi untuk setiap jawapan yang betul dan masa akan dikira sehingga berakhirnya game itu. Panduan dan nota diberi bertujuan untuk membantu pemain disamping memberi pengetahuan kepada mereka. Target aplikasi game ini adalah untuk pelajar sekolah rendah yang berumur 9-12 tahun yang mana mereka belajar Bahasa Inggeris pada tahun 3-6. Aplikasi game ini dibina menggunakan Unity dan Microsoft Visual Studio dengan kod C# untuk platform computer. Functional test telah dijalankan untuk serious game ini dimana 64 test kes dijalankan untuk menguji fungsinya dimana 100% berjaya. Satu tinjauan telah dijalankan untuk mengesahkan penerimaan pengguna dalam menggunakan serious game dalam belajar Bahasa inggeris untuk guru, ibu bapa dan pelajar dimana kedua-dua guru dan ibu bapa 94% memberikan jawapan yg positif. Untuk pelajar pula, 75% bersetuju bahawa serious game itu menarik dan menyeronokkan digunakan untuk belajar. Oleh itu, hasil kajian ini menunjukkan bahawa serious game dapat membantu pelajar untuk belajar Bahasa Inggeris secara interaktif dan menjanjikan masa depan yang baik dalam pembelajaran.

ABSTRACT

In primary and secondary schools in the Malaysia, English is taught as a second language. The main objective of the English language curriculum for schools is to help students acquire the language so that they can use it in their everyday life, to further their studies, and for work purposes. The issues arise when there are students who are very weak at absorbing and learning English due to the boring and uninterested learning environment in the class. Furthermore, mostly computer labs in the school did not used for learning session because of the lack off the digitals materials. Thus, this project propose a solution to implement a serious game in order to help students to learn English language in most interactive and fun way. This serious game focus on the Grammar topics that are Common Nouns, Proper Nouns, Countable Nouns and Uncountable Nouns. This game consist of easy, medium and hard level for each topic modules which required player to move the car forward to collect answers based on the questions given. The marks will be given for every correct answer and time will be counted until they finish the game. The notes and guideline are given in order to help and give information for player. The targeted user is the primary school students in age 9-12 years old which are they learn English language syllabus in year 3-6. The game application is the web-based platform that developed using Unity and Microsoft Visual Studio with C# programming language for scripting code. Functional test was carried out for this serious game where 64 test cases were executed in order to test its functionality, which resulted 100% successfully. A survey was carried out to validate the user acceptance test of serious game in learning English for teachers, parents and students where both teachers and parents 94% positive with the game application. For students, 75% they agreed that the serious game is fun and interesting for them to learn English. Hence, the findings of this study indicate that the serious game can help students to learn English in interactive ways and have a promising future in teaching English for primary school students.

TABLE OF CONTENT

DECLARATION

TITLE PAGE

ACKNOWLEDGEMENTS **ii**

ABSTRAK **iii**

ABSTRACT **iv**

TABLE OF CONTENT **v**

LIST OF TABLES **viii**

LIST OF FIGURES **ix**

LIST OF ABBREVIATIONS **xi**

CHAPTER 1 INTRODUCTION **12**

1.1 Introduction 12

1.2 Background of Study 12

1.3 Problem Statement 13

1.4 Goal & Objective 15

1.5 Scope 16

1.6 Thesis Organization 16

CHAPTER 2 LITERATURE REVIEW **17**

2.1 Introduction 17

2.2 Serious Game 17

2.3 Serious Game in Education 18

2.4 Review on Serious Games in Education 18

2.4.1	Reading Blaster Ages 9-12	19
2.4.2	Games to Learn English	20
2.4.3	Fun English Kids Learn English	21
2.5	Comparison between Serious Game in Education & Proposed Serious Game	22
2.6	Summary	26
CHAPTER 3 METHODOLOGY		27
3.1	Introduction	27
3.2	ADDIE Methodology	27
3.2.1	Analysis	29
3.2.2	Design	32
3.2.2.1	Game Overview	32
3.2.2.2	Game Content	33
3.2.2.3	Game Mechanics	53
3.2.2.4	Game Technology	54
3.2.3	Development	57
3.2.4	Implementation	57
3.2.5	Evaluation	57
3.3	Software & Hardware Requirement	58
3.3.1	Software Requirement	58
3.3.2	Hardware Requirement	59
CHAPTER 4 RESULTS AND DISCUSSION		61
4.1	Introduction	61
4.2	Implementation	61

4.2.1	Development Environment	62
4.2.2	Tools and Technologies	62
4.2.3	System Functionality	64
4.2.4	Sample Coding	71
4.3	Testing and Result Discussion	79
4.3.1	Functional Test	81
4.3.2	User Acceptance Test (UAT)	81
4.4	User Manual	83
CHAPTER 5 CONCLUSION		84
5.1	Introduction	84
5.2	Project Constraint	85
5.3	Future Work	86
REFERENCES		87
APPENDIX A		90
APPENDIX B		92
APPENDIX C		99
APPENDIX D		103
APPENDIX E		115
APPENDIX F		127
APPENDIX G		137

LIST OF TABLES

Table 2.1	Comparison between Serious Games in Education	22
Table 3.1	Car Charaters	34
Table 3.2	Game Control	52
Table 3.3	Software items used	58
Table 3.4	Hardware items used	59

LIST OF FIGURES

Figure 2.1	Reading Blaster Ages 9-12 front page	19
Figure 2.2	Games to learn English website	20
Figure 2.3	Fun English page	21
Figure 3.1	Phase of ADDIE model	28
Figure 3.2	Grammar Race context diagram	33
Figure 3.3	Grammar Race game content	36
Figure 3.4	Flowchart at main page	37
Figure 3.5	Flowchart for Common Nouns game	38
Figure 3.6	Flowchart for Proper Nouns game	39
Figure 3.7	Flowchart for Countable Nouns game	39
Figure 3.8	Flowchart for Uncountable Nouns game	40
Figure 3.9	Flowchart for Help	40
Figure 3.10	Flowchart for Notes	41
Figure 3.11	Main menu	42
Figure 3.12	Option Setting	43
Figure 3.13	Help Option	44
Figure 3.14	Game Control	45
Figure 3.15	Topic's note selection	46
Figure 3.16	Note	47
Figure 3.17	About Us	48
Figure 3.18	Quit	49
Figure 3.19	Level Selection	50
Figure 3.20	Playing field (Common Nouns - Easy Level)	51
Figure 3.21	Level Design	53
Figure 3.22	Game field	54
Figure 3.23	Option Setting	55
Figure 3.24	Game Paused	56
Figure 4.1	Unity tool	63
Figure 4.2	Asset Store	63
Figure 4.3	Microsoft Visual Studio 2017	64

Figure 4.4	Main Menu	64
Figure 4.5	Option popup box	65
Figure 4.6	Help popup box	65
Figure 4.7	Game Control popup box	66
Figure 4.8	About Us	66
Figure 4.9	Notes Selection	67
Figure 4.10	Common Nouns note popup box	67
Figure 4.11	Quit popup message box	68
Figure 4.12	Levels selection page	68
Figure 4.13	Game field	69
Figure 4.14	Guideline	69
Figure 4.15	Setting popup box	70
Figure 4.16	MainMenu.cs	71
Figure 4.17	CarUserControl.cs	72
Figure 4.18	CarController.cs	73
Figure 4.19	CarAudio.cs	74
Figure 4.20	ScoringSystem.cs	75
Figure 4.21	CollectedAnswer.cs	75
Figure 4.22	WrongCollectedAnswer.cs	76
Figure 4.23	Timer.cs	77
Figure 4.24	MusicSlider.cs	78
Figure 4.25	PauseFunction.cs	79
Figure 4.26	UAT for teacher pie chart result	81
Figure 4.27	UAT for parents pie chart result	82
Figure 4.28	UAT for students pie chart result	82

LIST OF ABBREVIATIONS

ICT	Information and Communications Technology
IR	Industrial Revolution
KSSR	Kurikulum Standard Sekolah Rendah
GUI	Graphical User Interface
C	Countable nouns
UC	Uncountable nouns
UAT	User Acceptance Test
2D	2 dimensional
3D	3 dimensional
HDD	Hard disk drive
MAC	Macintosh
OS	Operating System
PC	Personal Computer
PSM1	Projek Sarjana Muda 1
PSM2	Projek Sarjana Muda 2
UI	User Interface

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter, the background of study will be presented, followed by the problem statement, the objective, the scope of the project and the thesis of organization. The project background presented the main ideas of the thesis. All related information on the study are presented.

1.2 Background of Study

In primary and secondary schools in the Malaysia, English is taught as a second language. The main objective of the English language curriculum for schools is to help students acquire the language so that they can use it in their everyday life, to further their studies, and for work purposes. English is important, as with globalization, Malaysians will need to be proficient in the language and to communicate with people in other countries. The use of English in Information and Communications Technology (ICT) has also been integrated into the curriculum to enable students to gain knowledge on the Internet and to network with people both locally and abroad.(Kementerian Pendidikan Malaysia, 2004)

Essentially, a classroom ought to be an energizing spot for learning, a place where students come and spend their time and where teachers plan lessons that will inspire their students. The test scores and other types of data dwell on much of the fun and games in the classroom may be extirpate as a result. Is teaching with games, either computer games or a more traditional style like riddles, just fun and games? Can students learn at the same

time? More importantly, is it preferable to teach with games because students will be more preoccupied and therefore retain more of the material.

Besides that, children at the age of primary schools like to play than learning especially in learning English language. Indeed, even children growing up rapidly in process learning something new, they learn information quickly too. A child who is unveil to different dialects at a young age has a lot less demanding time processing and remembering the information they receive. However, what do we have to do in attracting them to learn the secondary language? The key to this new approach is that most children need flourish in competitive environments. Moreover, they need more movement or kinaesthetic learning and that more social interaction helps many children learn.(Carlson & Stamm, 2015)

The capability of serious game that use pedagogy to implant instruction into the game play experience is applicable, because a large and growing society is adapted with playing games that can present users with realistic and imperative challenges, tremendously stimulating their information processing capabilities and capturing their concentration span for long duration. (Bellotti, Berta, & De Gloria, 2010). One of the advantages is the serious game can creates interest towards the subject matter, especially in subjects that student struggle with. The good serious game test the players' sense riveting situations, providing concrete, compelling contexts where the player gets concretely involved (Bellotti et al., 2010). Moreover, most gamification systems provide a quick feedback such as leader boards or scoreboards that students can view their performances where they stand among their companion. As a result, it can motivate student to try the quiz or activity again to get a great marks and gives encouragement for further lesson engagement.

1.3 Problem Statement

The issue of starting to teach foreign languages in the formal education is rather complex and besides highlighting the positive aspects of early start, several problematic areas have to be mentioned as well (Yao Sua & Raman, 2007) . Ellie state in the paper, that the second language is define as the way in which people learn a language other than their mother tongue, either outside or inside the school. (Ellie, 1997) Children who are

weak at absorbing or acquiring a foreign language in the best possible way are because there are some possible issues such as they have various language backgrounds. In addition, they also are not highly motivated and energetic and get easily frustrated if they were corrected immediately (Hashemi & Azizinezhad, 2011). There are also students who love to work alone and hate being in a group work make it hard for teacher to approach them.

Currently in education when a person mentions games, he or she is usually referring to video games. Many classrooms tend to have few computers, not enough for an entire class of students to use computers at once. Besides that, the projector is not provided because the term of cost and the space in the classroom. Many thought-provoking and problem-solving types' of computer games are time consuming and cannot be easily fit into the already full school day. However, many district computer servers block any site that has the word 'game' in it, so students cannot even log on to these at school.(Carlson & Stamm, 2015) Because of this problem, they going through the learning with some traditional games like Word List or Bingo that required materials such as stationeries, papers and books. Therefore, this kind of learning environment can bring up students to feel boring and uninterested in taking part because every day they are doing the same activities by reading and writing.

Developing a game is a heavy issue, especially when the pedagogical objectives where one is heading in the background of the game or what we name "serious game". (Darwesh, 2016) In our country, there is not much serious game for educational purpose especially in learning English for primary students. We know that many games has been developed from another country but it is the content suitable for primary students in Malaysia? It is the element of the games are safe for them to play or similar with the primary school English language syllabus? Whatever it is, to find the good games is very difficult.

On the other hand, we are entering the era of the Fourth Industrial Revolution 4.0 (IR 4.0), which is expected to transform the way we live, work and play (Zainon, 2018) . The mission of 2020 is to establish an educational system with excellent quality that will realize the hidden gems of the individual and fulfil the aspiration of the 'One Malaysian nation'. The Education ministry's articulation of the vision for ICT (Information and Communication Technologies) in education focuses on three major

REFERENCES

REFERENCES

- (2012). In L. E. Seong, M. Kaur, & Z. b. Awong, *English Year 3* (pp. 1-40). Kuala Lumpur: Dewan Bahasa dan Pustaka.
- Culatta, R. (2018). *ADDIE Model*. Retrieved from InstructionalDesign.org:
<http://www.instructionaldesign.org/models/addie/>
- Dill., K. E. (2013). *The Oxford Handbook of Media*.
- Dwyer, O. (n.d.). *Games to Learn English*. Retrieved from Games to Learn English:
<https://www.gamestolearnenglish.com/>
- Dylan. (n.d.). *Reading Blaster Ages 9-12*. Retrieved from Download Free Games:
https://www.download-free-games.com/pc/reading_blaster_ages_9_12.htm
- EN, N. (21 September, 2015). *How to create a Timer [Tutorial][C#] - Unity 3d*. Retrieved from YouTube: <https://www.youtube.com/watch?v=x-C95TuQtf0>
- EYEmaginary. (31 January, 2016). *Car AI Tutorial #1 (Unity 5) - Make the Path*. Retrieved from YouTube:
<https://www.youtube.com/watch?v=o1XOUkYUDZU>
- iD8. (16 May, 2016). *Unity 3d Race Timer Script*. Retrieved from YouTube:
https://www.youtube.com/watch?v=E5vDY0_rfFg
- Khemchandani, M. (27 August, 2017). *Unity3D - How To Pause And Resume Game Sound*. Retrieved from YouTube:
https://www.youtube.com/watch?v=1_8CBcf098g
- Kurt, S. (29 August, 2017). *ADDIE Model: Instructional Design*. Retrieved from Educational Technology: <https://educationaltechnology.net/the-addie-model-instructional-design/>

- Official, M. S. (10 September, 2018). *Adding unity score system and Game Over Features in unity / unity display score / game over screen*. Retrieved from YouTube: <https://www.youtube.com/watch?v=5MIa2I3uaPk>
- SpeedTutor. (24 July, 2018). *Simple Pause Menu in Unity 2018*. Retrieved from YouTube: <https://www.youtube.com/watch?v=pbeB9NsaoPs>
- Tutorials, C. (23 May, 2018). *Open and Close Menus with Buttons or Escape Key / Unity 2018 Game Development*. Retrieved from YouTube: <https://www.youtube.com/watch?v=aN11LnIF89I&t=25s>
- Unity. (30 Jun, 2014). *Unity 4.6 - New UI World Space Canvas*. Retrieved from YouTube: <https://www.youtube.com/watch?v=Mzt1rEEdeOI>
- Vegas, J. (15 March, 2017). *[COMPLETE] How To Make A Driving & Racing Game Unity Tutorials* . Retrieved from YouTube: <https://www.youtube.com/watch?v=MQ5GJPIAGS4&list=PLZ1b66Z1KFKgkE9ji0tF2iDO0LGxmlwIm&index=2&t=0s>
- Vegas, J. (17 June, 2018). *Mini Unity Tutorial - How To Make A Collectable And Scoring System In C#*. Retrieved from YouTube: <https://www.youtube.com/watch?v=D0lx90n0s-4>
- Zainon, A. P. (16 May, 2018). Retrieved from New Straits Times: <https://www.nst.com.my/opinion/letters/2018/05/369925/education-key-ir-40-success>
- Zotov, A. (21 May, 2018). *Unity Tutorial How To Create Slider To Control Music Or Sound Volume Modifying Audio Source Volume*. Retrieved from YouTube: <https://www.youtube.com/watch?v=QZDw8ycoLRw>